

## ABSTRACT OF THE DISCLOSURE

In an IGBT with a built-in freewheeling diode, a thickness (D) of a polished wafer is equal to  $200\text{ }\mu\text{m}$  or smaller, and each of respective thicknesses (T8) and (T9) of an  $\text{N}^+$ -type cathode layer (8) and a  $\text{P}^+$ -type collector layer (9) is equal to  $2\text{ }\mu\text{m}$  or smaller.

- 5 Further, a total width of the  $\text{N}^+$ -type cathode layer (8) and the  $\text{P}^+$ -type collector layer (9) which extends along a width direction (X) is in a range from  $50\text{ }\mu\text{m}$  to  $200\text{ }\mu\text{m}$ . In this case, an interface (IF2) between a collector electrode (10) and the  $\text{P}^+$ -type collector layer (9) occupies 30-80% of an interface (IF) between the collector electrode (10) and the  $\text{P}^+$ -type collector layer (9) plus the  $\text{N}^+$ -type cathode layer (8).